Amendments to Claims

This listing of claims will replace all prior revisions and listings of claims in this application.

Listing of Claims

1. (**Previously Presented**) A method comprising:

generating a phase-shift keyed optical signal; and

propagating the phase shift keyed optical signal through a semiconductor optical amplifier in deep saturation, such that an optical signal exhibiting a regulated, amplified optical power is produced;

wherein the amplified optical power is regulated to a saturation output power such that ΔP_{OUT} (dB)/ΔP_{IN}(dB) of the optical amplifier is less than 0.25, wherein P_{OUT} is the power of the optical signal output from the amplifier, and P_{IN} is the power of the optical signal input into the amplifier.

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2. (**Previously Presented**) The method of claim 1, wherein the amplified optical power is regulated to about the saturation output power of the semiconductor optical amplifier.

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3. (**Previsously Presented**) The method of claim 1, wherein a gain recovery time of the optical amplifier is larger than the bit period of the optical signal.

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4. (**Original**) The method of claim 1, wherein the optical signal has a data-independent intensity profile.

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5. (**Original**) The method of claim 1 wherein the optical signal is RZ-DPSK signal.

1

6. (**Original**) The method of claim 1, wherein the optical signal is an π/2-DPSK signal.

1

7. (**Original**) The method of claim 1, wherein the optical signal is a constant-intensity DPSK signal.

1

8. (**Original**) The method of claim 1, wherein the optical signal is an RZ-DQPSK signal.

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9. (**Cancelled**)

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10. (**Previously Presented**) A method for optical limiting amplification comprising:

inputting a phase-shift keyed optical signal having a data independent intensity profile into a semiconductor optical amplifier in a deep saturation regime such that an optical signal exhibiting a regulated, amplified optical power is produced and output, wherein $\Delta P_{OUT}(dB)/\ \Delta P_{IN}(dB)$ is less than 0.25, where P_{OUT} is the power of the optical signal output from the amplifier, and P_{IN} is the power of the optical signal input into the amplifier.

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11. (**Previously Presented**) The method of claim 10, wherein a gain recovery time of the optical amplifier is larger than the bit period of the optical signal.

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12. (**Original**) The method of claim 10, wherein the optical signal is an RZ-DPSK signal.

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13. (**Original**) The method of claim 10, wherein the optical signal is an π/2-DPSK signal.

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14. (**Original**) The method of claim 10, wherein the optical signal is a constant-intensity DPSK signal.

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15. (**Original**) The method of claim 10, wherein the optical signal is an RZ-DQPSK signal.

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16.(**Cancelled**)

17. (**Previously Presented**) An optical signal processor apparatus comprising:

a semiconductor optical amplifier device adapted to operate in deep saturation and to receive an RZ-DPSK optical signal having an amplitude-shift keyed optical label portion, such that the optical label portion of the signal is removed upon propagation through the semiconductor optical amplifier device;

wherein $\Delta P_{OUT}(dB)/\ \Delta P_{IN}(dB)$ is less than 0.25, where P_{OUT} is the power of the optical signal output from the amplifiers, and P_{IN} is the power of the optical signal input into the amplifiers.

18. (**Cancelled**)

19. (**Previously Presented**) An optical communication system for transmitting multi-channel phase-shift keyed optical signals comprising:

a plurality of semiconductor optical amplifiers,

wherein the system is adapted to transmit the optical signals such that the plurality of semiconductor optical amplifiers operate in a deep saturation regime so as to provide optical power equalization of a plurality of channels of the multi-channel optical signals,

wherein $\Delta P_{OUT}(dB)/\ \Delta P_{IN}(dB)$ is less than 0.25, where P_{OUT} is the power of the optical signal output from the amplifiers, and P_{IN} is the power of the optical signal input into the amplifiers.

20. (**Previously Presented**) An apparatus comprising:

a means for generating a phase-shift keyed optical signal; and

a means for propagating the optical signal through a semiconductor optical amplifier in deep saturation to regulate the amplified optical power;

wherein $\Delta P_{OUT}(dB)/ \Delta P_{IN}(dB)$ is less than 0.25, where P_{OUT} is the power of the optical signal output from the amplifiers, and P_{IN} is the power of the optical signal input into the amplifiers.

21. (**New**) A method comprising:

generating a phase-shift keyed optical signal; and

propagating the phase shift keyed optical signal through a semiconductor optical amplifier in deep saturation, wherein $-4dBm < P_{IN} < 4dBm$ such that an optical signal exhibiting a regulated, -amplified optical power is produced;

wherein the amplified optical power is regulated to a saturation output power such that ΔP_{OUT} $(dB)/\Delta P_{IN}(dB)$ of the optical amplifier is less than 0.25, wherein P_{OUT} is the power of the optical signal output from the amplifier, and P_{IN} is the power of the optical signal input into the amplifier.

22. (**New**) A method for optical limiting amplification comprising:

inputting a phase-shift keyed optical signal having a data independent intensity profile into a semiconductor optical amplifier in a deep saturation regime wherein $-4dBm < P_{IN} < 4dBm$ such that an optical signal exhibiting a regulated, amplified optical power is produced and output, wherein $\Delta P_{OUT}(dB)/ \Delta P_{IN}(dB)$ is less than 0.25, where P_{OUT} is the power of the optical signal output from the amplifier, and P_{IN} is the power of the optical signal input into the amplifier.

23. (**New**) An optical signal processor apparatus comprising:

a semiconductor optical amplifier device adapted to operate in deep saturation wherein $-4dBm < P_{IN} < 4dBm$ and to receive an RZ-DPSK optical signal having an amplitude-shift keyed optical label portion, such that the optical label portion of the signal is removed upon propagation through the semiconductor optical amplifier device;

wherein $\Delta P_{OUT}(dB)/ \Delta P_{IN}(dB)$ is less than 0.25, where P_{OUT} is the power of the optical signal output from the amplifiers, and P_{IN} is the power of the optical signal input into the amplifiers.

24. (**New**) An optical communication system for transmitting multi-channel phase-shift keyed optical signals comprising:

a plurality of semiconductor optical amplifiers,

wherein the system is adapted to transmit the optical signals such that the plurality of semiconductor optical amplifiers operate in a deep saturation regime wherein $-4dBm < P_{IN} < 4dBm$ so as to provide optical power equalization of a plurality of channels of the multi-channel optical signals,

wherein $\Delta P_{OUT}(dB)/ \Delta P_{IN}(dB)$ is less than about 0.25, where P_{OUT} is the power of the optical signal output from the amplifiers, and P_{IN} is the power of the optical signal input into the amplifiers.

25. (**New**) An apparatus comprising:

a means for generating a phase-shift keyed optical signal; and

a means for propagating the optical signal through a semiconductor optical amplifier in deep saturation wherein $-4dBm < P_{IN} < 4dBm$ to regulate the amplified optical power;

wherein $\Delta P_{OUT}(dB)/ \Delta P_{IN}(dB)$ is less than 0.25, where P_{OUT} is the power of the optical signal output from the amplifiers, and P_{IN} is the power of the optical signal input into the amplifiers.